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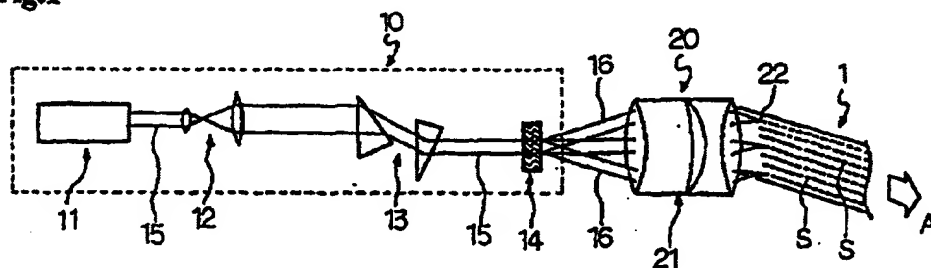
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(54) **METHOD OF WRITING SERVO SIGNAL ON MAGNETIC TAPE**

(57) A method of writing servo signals on magnetic tape which comprises making a single laser beam (15) pass through a diffraction element (14) to split it into a plurality of beams (16) traveling in prescribed directions and then making the plurality of beams (16) pass through an optical convergence system (21) to form

converged beam spots on a site of a magnetic tape (1) which is capable of forming servo tracks, the magnetic tape (1) being running at a prescribed speed, to cause the site to change physically or chemically thereby forming a plurality of servo tracks (S) in the longitudinal direction of the tape simultaneously.

Fig.1



Description

Technical Field:

[0001] The present invention relates to a method and an apparatus for writing servo signals on a magnetic tape, by which a large number of servo tracks having a small pitch can be formed at a time.

Background Art:

[0002] One of means for increasing the recording capacity of a magnetic tape is to increase the density of data tracks. However, as the track density increases, the distance between adjacent data tracks is shortened, and it becomes more likely that the magnetic head strays off the right position during data recording or reproduction, failing to keep accuracy of recording or reproduction. In order to achieve accurate recording or reproduction by preventing such positional deviation from happening, various servo tracking systems have been proposed.

[0003] One of the servo tracking systems for magnetic tape that has been proposed is forming servo tracks corresponding to servo signals on a magnetic tape magnetically or by mechanical stamping. According to this system, the smaller the distance between servo tracks formed, the more accurate the servo control. To achieve this, however, a complicated or large-sized apparatus is required for servo signal writing, which is followed by an increased production cost.

[0004] Accordingly, an object of the present invention is to provide a method and an apparatus for writing servo signals on a magnetic tape which will make it possible to form a large number of servo tracks at a small pitch simultaneously.

Disclosure of the Invention:

[0005] The present invention accomplishes the above object by providing a method of writing servo signals on a magnetic tape, which comprises making a single laser beam pass through a diffraction element to split it into a plurality of beams traveling in prescribed directions and then making the plurality of beams pass through an optical convergence system to form converged beam spots on a site of a magnetic tape which is capable of forming servo tracks, the magnetic tape being running at a prescribed speed, to cause the site to change physically or chemically thereby forming a plurality of servo tracks in the longitudinal direction of the tape simultaneously.

[0006] The present invention also provides an apparatus for writing servo signals on a magnetic tape, which is preferably used to carry out the above-mentioned method, which comprises a system for running a magnetic tape, a light source system for splitting a single laser beam into a plurality of beams, and an optical sys-

tem for forming the plurality of beams into converged beam spots aligned at a prescribed interval on a prescribed site of the magnetic tape, wherein the light source system has a light source emitting the laser beam and a diffraction element which splits the laser beam into a plurality of coplanar beams making equal divergent angles with each other, the diffraction element being disposed so that the direction in which the converged beam spots are aligned and the running direction of the magnetic tape may make an angle larger than 0° and smaller than 90°.

Brief Description of the Drawings:

[0007]

Fig. 1 schematically illustrates an embodiment of the servo signal writing apparatus which can be used to carry out the method of the present invention.

Fig. 2 schematically shows the way of a laser beam's being split by a diffraction element.

Fig. 3 is a schematic plan view of a magnetic tape on which servo tracks are being formed.

Best Mode for Carrying out the Invention:

[0008] The present invention will be hereunder described with reference to its preferred embodiment by way of the accompanying drawings. Fig. 1 schematically illustrates an embodiment of the servo signal writing apparatus which can be used to carry out the method of the present invention. The apparatus shown has a magnetic tape running system (not shown), a light source system 10, and an optical system 20.

[0009] The magnetic tape running system comprises a feed reel having a magnetic tape, on which servo tracks are to be formed, wound therearound, a take-up reel for taking up the fed magnetic tape, and a driving means for revolving these reels. These members are set to make magnetic tape 1 run in direction A. Such a running system has the same mechanism as that in a conventional magnetic tape recording and reproducing drive. While not shown, the running system also has a means for regulating either edge of the running magnetic tape 1, by which fluctuation of the running magnetic tape 1 in the width direction may be prevented thereby to keep the distance from that edge to each servo track constant.

[0010] The light source system 10, which is to split a single laser beam 15 into a plurality of split beams 16, comprises a light source 11 for emitting a laser beam, a beam expander 12, an anamorphic prism 13, and a diffraction element 14.

[0011] Various lasers can be used as the light source 11. A pulse laser is preferably used to minimize the damage to the thin magnetic tape, which is the object of laser machining. Pulse lasers that have a sufficient output and